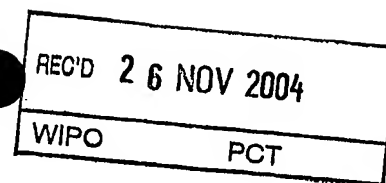


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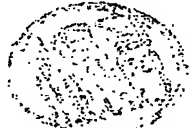
INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT-1472	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/KR2002/001749	International filing date (day/month/year) 18 SEPTEMBER 2002 (18.09.2002)	Priority date (day/month/year) 30 JULY 2002 (30.07.2002)
International Patent Classification (IPC) or national classification and IPC IPC7 B01D 59/34		
Applicant KOREA ATOMIC ENERGY RESEARCH INSTITUTE et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:
- I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 20 FEBRUARY 2004 (20.02.2004)	Date of completion of this report 17 NOVEMBER 2004 (17.11.2004)
Name and mailing address of the IPEA/KR  Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer KIM, Yong Jung  Telephone No. 82-42-481-5557

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/KR2002/001749

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☐ the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement) under Article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the drawings:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed," and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION

International application No.

PCT/KR2002/001749

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	1-10	YES
	Claims	None	NO
Inventive step (IS)	Claims	1-10	YES
	Claims	None	NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims	None	NO

2. Citations and explanations (Rule 70.7)

1) The present invention relates to a method of separating thallium isotopes comprising the following steps of: isotope selective optical pumping of target isotopes into a metastable state with laser, photoionization of the metastable thallium atoms to continuum states through a resonant excited state, and the collection of photoionized thallium isotopes.

2) Reference is made to the following document:

D1: FR 2790974 A1 (22 September 2000)

D1 relates to a method of separating ^{203}Tl from the vapor of thallium having a plurality of isotopes including ^{203}Tl .

3) Novelty & Inventive step

The present invention is the same as D1 in the method of separating a particular thallium isotope from vapor of thallium having a plurality of isotopes, and partially the same in the technical feature of the steps of producing photons of a first, a second, or a third frequency by a laser system, applying said photons of said first, second and third frequencies to said vapor of thallium and collecting thallium isotope.

However, the present invention is different from D1 in the step of isotope selective optical pumping (ISOP) of target isotopes into a metastable state, a step of resonant photoionization of the metastable atoms containing target isotopes to continuum states through a resonant excited state and a step of collecting photoionized thallium isotopes.

As a result of said difference, in D1, the drop of the excitation efficiency is inevitable since it is practically impossible to overlap the laser pulses during the entire counter-propagation in medium; and for the case of mass production of thallium isotopes, initially produced plasma may screen the external electric field in the process of field-ionizing Rydberg state isotope and decreases the field ionization efficiency.

(Continued on Supplemental Sheet)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of:

Box No. V

However, in the present invention, through isotope selective optical pumping (ISOP), only target isotopes remain in a metastable state; and through resonant photoionization, thallium atoms are directly photoionized with pulsed laser, thereby enhancing the efficiency of photoionization and preventing the ionization efficiency from being lower in a case of mass production.

Accordingly, the present invention provides more economical method of separating a large amount of thallium isotopes effectively than D1 by using commercially available lasers and a relatively small-scale facility.

Thus, claims 1-10 of the present invention are novel and inventive under PCT Article 33(2)-(3).

4) Industrial Applicability

Claims 1-10 of the present invention are industrially applicable under PCT Article 33(4).